WORK IT

Name _____ Date _____ Block _____

Objective: To observe how your gravitational potential energy and your kinetic energy change.

Calculate YOUR MASS:

Using the force scale, **what is your weight**? _____ N

Use this formula to **solve for your mass**: Weight = force • g

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Who will be running/jogging the stairs? Who's data are you using? _____

Raw Data:

Runner's Mass (kg)	Acceleration due to Gravity: "g" (m/s^2)	Height of Stairs (m)	Distance of Stairs (m)	Time Trial 1 (sec)	Time Trial 2 (sec)	Time Trial 3 (sec)

Calculated Data:

Average Time (sec)	Velocity (m/s)	Gravitational Potential Energy (J)	Kinetic Energy (J)

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The work you do running the stairs is equivalent to your change in energy.

Soooo, to figure out the runner's work output, carry out the following steps:

1. Add together potential and kinetic energy for the runner:

   This is the runner's work output = _____

2. Now divide by the average time it took the runner to run the stairs:

   This is the runner's power output = _____

3. **Calculate runner's horsepower.** [746 watts = 1 horsepower]

   Show work!

Follow-Up Questions

1. In your own words, explain the relationship between work and energy. [work-energy theorem]

   _____

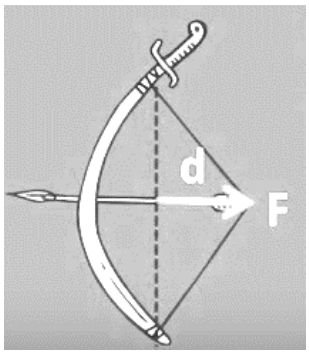
   _____

   _____

   _____

2. An archer exerts an average horizontal force of 55 N on her bow and arrow system in pulling the string back 0.35 m. If the arrow has a mass of 0.35 kg, **what is the horizontal speed** of the arrow as it hits the target 10 m away? [55 N is the *net* force on the arrow]

   SHOW WORK PLEASE



$$\text{Work} = \Delta E_k$$

$$f \cdot d = \tfrac{1}{2} mv^2$$